Horse Heaven Wind Project EFSEC Review
Data Request No. 3
July 22, 2021

The following table provides Scout's responses to EFSEC's data requests dated 7/22/21. We have provided full responses where possible; however, some requested analysis will require additional time to prepare. In these instances, we have indicated that additional information will be provided under separate cover at a later date. These include:

- Data Requests where a full response will be provided under separate cover at a later date:
  - Recreation-1

Data Request 3 Item ID	Code Citation Application Section	Item	Question or Information Request.	Applicant Response (bold text indicates response conclusion and Applicant commitments, including commitments to provide supplemental materials).
Wildlife-22	WAC: 463-60-332 Appendix M	Appendix M. Bird and Bat Conservation Strategy	The data in Appendix M appears to only use 150 meters or the Rotor Swept Height (RSH) exposure criteria. Provide exposure criteria for the 200-meter and 205-meter turbines. Confirm where the data for the larger machines came from.	**Risk exposure indices for small birds and large birds were calculated for four Turbine types** and their corresponding rotor swept height (RSH) that included: • General Electric 2.82 MW (25 − 155 m RSH) • General Electric 3.03-MW (10 − 155 m RSH) • General Electric 5.5-MW (45 − 205 m RSH) • Siemens Gamesa 6.0-MW (30 − 200 m RSH) **Results of exposure indices for 200 m and 205 m Turbines are also provided in Appendix A and B of the BBCS (Appendix M of the Application).** The range of the RSH defines the lowest and highest height of rotor blades above ground level. **The Turbine specifications for the four Turbine technologies were obtained from the Turbine manufacturer**.
Wildlife-23	WAC: 463-60-332 Appendix M	Wildlife Survey	A portion of Horse Heaven West only had 3-months of surveys conducted, particularly in the Webber Canyon area, as shown on the Project maps. If a full year's worth of data was not collected, provide rationale for why a 3-month survey period is sufficient to analyze impacts to wildlife in this area.	Of the 94 large bird use point count stations, 5 points (i.e., 5% of points) were surveyed for approximately 3 months. Points were added due to changes in Project design. Of the 5 points, 2 points no longer overlap with the Project footprint and 2 points were in proximity (within 1,500 meters) to the main stem of Webber Canyon. Avian use point count data are aggregated as an average of all points and all surveys thus representing mean use over the landscape over time. **Considering the scale and depth of the dataset, inclusion, or exclusion of any one point will likely have a marginal effect on the average mean use, species richness, species composition, and flight metrics.**
Wildlife-24	WAC: 463-60-332 Section: 3.4.2.3	Avian	When an avian species is flying within the RSH), and there is a five deep turbine array that must be traversed, does that change the exposure rate, and is that included in the calculation? Is it intuitive that a bird flying through a wind turbine project arrayed as a single ridge top turbine row would have less exposure than a bird flying through an array that is five or six turbines deep?	**Calculation of the exposure index does not consider the geometry of the facility (i.e., the 'layout' or how Turbines are organized on the landscape).** The interaction described in the hypothetical scenario would be dependent on species-specific avoidance behavior, inter or intra species-specific behaviors, foraging behavior, weather, among many other factors (Barrios and Rodrigues 2004, USFWS 2013, among others). Spacing between Turbines along a string is approximately 0.25 miles from the tower base and the perpendicular distance between strings are much greater (approximately 0.5 – 1 miles), which would allow corrective flight and avoidance behavior. **As discussed in the BBCS (Appendix M of the Application), the exposure calculation is not a rate nor a likelihood; instead, it is a unitless index that does not account for other possible collision risk factors**. Calculation of the exposure index (R) is calculated using the following formula, $$R = A \times P_f \times P_t$$ where A equals the mean relative use for species i averaged across all surveys, P_f equals the proportion of all observations of species i where activity was recorded as flying (an index to the approximate percentage of time species i spends flying during the daylight period), and P_t equals the proportion of all initial flight height observations of species i within the likely rotor-swept height (RSH) for proposed Turbines at the Project. In-flight avoidance behavior and habituation are key aspects in a collision risk scenario that are that not calculated in the exposure risk index. Bird avoidance rates are typically high (>98%; Luzenski et al. 2016, Bowgen and Cook 2018) and habituation to structures occur over time which reduces the potential for bird collisions (Watson et al. 2018).

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Wildlife-25	WAC: 463-60-332 Section: 3.4.3	Avian	A public scoping comment noted that "In my May 2021 edition of Reader's Digest it was reported that a nine-year study at a wind farm in Smola, Norway revealed, "that bird strikes can be cut by more than 70 percent simply by painting one blade of a wind turbine black." Advise on the efficacy of this mitigation, whether it was considered for the Project, and if not provide rationale for why it is not applicable.	**Paint colors must be approved by FAA, which to date has prohibited the painting of blades/tips.** Per FAA Advisory Circular 70/7460-1L, wind Turbines should be painted white or light grey, as these colors have been shown to be the most effective method for providing daytime conspicuity (i.e., quality of being conspicuous to air traffic). Wind Turbine manufacturers typically use a European color-matching system that is referred to as the RAL Color Standard. Most wind Turbines currently produced are painted light grey, RAL 7035, which is the darkest acceptable off-white paint allowed. The preferred white paint color is pure white, RAL 9010, or an equivalent. Blades or blade tips shall not be painted or manufactured in colors to camouflage wind Turbines with the surrounding terrain for safety purposes.
Wildlife-26	WAC: 463-60-332 Section: 3.4.3	Avian	The status of the Ferruginous hawk in Washington may change, requiring additional buffers and mitigation. Explain how the Project can apply appropriate mitigation and setback for Ferruginous hawk if it is listed as Endangered.	A set-back of 0.25-mi from occupied ferruginous hawk nests are accounted for in the Turbine layout, per WDFW recommendation and Larsen et al. (2004). **An administrative change in the listing status of ferruginous hawk would not change the best management practices already incorporated into Turbine layout and operational procedures.**
Wildlife-27	WAC: 463-60-332 Sections 3.4.2 and 3.4.3 Appendix M	Pronghorn	Provide information on pronghorn antelope presence and use of the Project area, Project-related impacts, and mitigation.	**Pronghorn populations in the adjacent Yakima Reservation may overwinter in the Horse Heaven Hills and are increasing (Fidorra et al. 2019).** Current minimum population estimates are approximately 250 animals (M. Ritter, WDFW, pers. comm). Reintroduction efforts continue with tribal entities. Telemetry data show some pronghorn use of the western portion of the Project Lease Boundary (M. Ritter, WDFW, pers. comm). **Effects on pronghorn would include avoidance of construction activities, removal of grassland and shrubland habitat that provide cover and forage (see Table 3.4-14 in Section 3.4.2.1 of the ASC), and reduction in habitat connectivity due to fenced solar arrays that would exclude pronghorn from the solar array areas, and potentially cause individuals to find alternative travel routes (also see our response to "Wildlife-1" in Request Package #2)** **No specific mitigation measures are proposed for pronghorn; however, general biological mitigation measures that would address all wildlife species (including pronghorn) are addressed in our response to Data Request "Wildlife-7" though "Wildlife-11" in Request Package #2.**
Wildlife-28	WAC: 463-60-332 Section 3.4.2.1 Appendix M	Wildlife Corridors	Provide information on terrestrial wildlife corridors (east/west as well as north/south) within the Project area and how the Project will maintain connectivity. Advise how the Project would potentially impact the connectivity along the ridgeline.	**See Figure 1 of Attachment "Wildlife-20" in the EFESC Data Request #2 for a map of terrestrial wildlife linkages and connectivity**. The corridors and connectivity referenced in the question are data modeled by the Arid Lands Initiative (2014). ALI discusses wildlife connectivity and corridors in terms of Priority Core Areas and Habitat Linkage Areas (ALI 2014). **Connectivity along the east/west ridgeline to the north of the Project and the north/south corridor to the west of Interstate 82 have been avoided or minimized by designing the Project to avoid impacts to higher priority Habitat Linkage Areas. Along the northern ridgeline, Turbines and associated roads have been set-back and do not overlap with priority core areas or high/very high Linkage Areas (Data Request #2, Attachment Wildlife-20, Figure 1).** Of the 244 proposed Turbines, a small number (11 Turbines or 4 % of all Turbines) are found within the north/south high linkage area. The remaining Turbines are located outside high and very high Linkage Areas, as defined by ALI. Along the north/south corridor, approximately 11 Turbines (4%) located within a Linkage Area will remain unfenced and open to wildlife movement. Spacing between Turbines along a string will be approximately 0.25 miles from the tower base and the perpendicular distance between strings will be much greater (approximately 0.5 – 1 mile), which would maintain open areas of habitat (agriculture, grassland, and shrub-steppe), facilitate wildlife movement, and maintain habitat connectivity. A small portion of the eastern solar array overlaps with, but does not substantially encroach, into a Linkage Area and thus would not impede species movement or habitat connectivity within the Linkage Area. **The two solar arrays located on the west side of the Project area do not overlap with a Priority Core Area or High Linkage Area. Wind turbines and associated infrastructure (with the exception of O&M buildings/substations) will remain unfenced, resulting in reduced habitat fragmentation and facilitate open movement of terrestrial wildlife species.** By designing the Project in a manner that avoids or minimizes disturbances in modeled corridor areas, terrestrial wildlife corridors within the Horse Heaven Hills will be maintained.

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Wildlife-29	WAC: 463-60-332 Appendix L	Wildlife	Discuss how the Applicant will avoid or minimize construction and operation impacts and activities in the canyons/draws within and in proximity to the Project area.	**No construction within Webber or Sheep Canyon's is planned; collector/transmission lines may span canyons, but no other Project facilities would be constructed in the canyon/steep slopes.** Roads/collector lines may cross ephemeral stream beds; temporary disturbance in these areas would be minimized (e.g., through use of applicable erosion control devices, minimizing construction footprint to the extent practical, etc.).
Noise-1	WAC: 463-60-352 Appendix O Addendum	Noise Baseline Measurement Methodology Appendix states a 3.5-inch windscreen was used, but Table 2-1 states a 7-inch screen was used.	Confirm which windscreen was used and what speed it mitigates self-generated wind noise.	**The Larson Davis WS001 3.5-inch windscreen was used in the Horse Heaven Wind Project baseline sound survey.** This type of windscreen mitigated self-generated noise from wind for **wind speeds ranging from 0 m/s to greater than 30 m/s**.
Noise-2	WAC: 463-60-352 Appendix O Addendum	Noise Baseline Measurement Methodology Measurements were not collected in the entire Project Area (northwest and north of the Project). These areas include the communities south of East Badger Road to the north of the Project and near the community of Kiona of Benton City to the northwest of the Project.	Provide baseline analysis, similar to the analysis provided for other areas in Appendix O, for existing conditions northwest and north of the Project Area.	While measurements may have not been collected specifically in the communities south of East Badger Road to the north of the Project and near the community of Kiona of Benton City to the northwest of the Project, **ambient sound measurements collected at other locations are considered representative of sound levels in those communities.** Ambient sound levels collected at ML-1 are considered representatives of the communities south of East Badger Road and near the community of Kiona of Benton City. Additionally, Project-related operational sound levels are expected to be low in these communities as shown in Figures 4.1.1-2 through 4.1.1-5 of the EFSEC ASC. The following provides more information regarding this. The five noise monitoring locations mentioned in this comment were selected by first reviewing the locations of the Turbines in comparison to the receptor locations and land use status (participating versus non-participating). A screening-level noise model was then developed to generate sound contours to identify areas expected to experience elevated noise impacts. In addition to using those results, other factors such as land use, participant status, distance to Turbines, and geographical distribution were considered in selecting the ambient sound monitoring locations. Property access, which was coordinated by Horse Heaven Wind Farm, LLC, was also a factor as it was necessary to obtain access to safely site the long-term monitors. As can be seen in Figure 1-1 of Appendix O (Horse Heaven Wind Project Baseline Sound Survey Report), the five monitoring locations are spread throughout the Project area, with ML-1 and ML-4 positioned to reflect moderately denser areas of residential use, and ML-2, ML-3, and ML-5 reflecting sound levels representing more scattered residential areas. By selecting locations with geographic and residential proximity differences, an accurate characterization of existing sound levels throughout the Project area could be obtained. **Based on the justification provided above, the Project does not intend to conduct additional baseline analysis.**
Noise-3	WAC: 463-60-352 Appendix O Addendum	Noise Baseline Measurement Methodology	Confirm the on-site MET station tower height and what instrumentation was used to collect the wind speed data.	Onsite met tower 4731 was primarily used to document ambient sound levels correlated by wind speed within the Horse Heaven Wind Project area; **this tower has a height of 100 meters above ground level. That tower is equipped with NRG Class 1 anemometers ranging in height from 30 meters to 98 meters above ground.**
Noise-4	WAC: 463-60-352 Section 4.1.1.2	Construction Noise Impacts	Quantify construction noise levels at noise sensitive receptors (NSRs). NSRs are identified in Figure 4.1.1-1 from the Application for Site Certification (February 2021) and meet land use standards outlined in WAC 173-60-30 for Class A lands. Confirm that NSRs would be considered Class A lands.	**Attachment "Noise-4" contains our response to this data request.**

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Noise-5	WAC: 463-60-352 WAC: 463-62-030 Section 4.1.1.2	Noise Impacts Energy facilities shall meet the noise standards established in chapter 70.107 RCW, the Noise Control Act of 1974; and state rules adopted to implement those requirements in chapter 173-60 WAC, Maximum environmental noise levels.	Include noise levels at the boundary in the modeling assessment as boundary locations and compare to WAC limits.	In addition to the sound contour figures shown in Figures 4.1.1-2 through 4.1.1-5 of the ASC, discrete receiver points were positioned along the Project property boundary to evaluate compliance with the applicable WAC limits. **The results of the Project property boundary compliance review are as follows:** • **For the Option 1 Project layout configuration using the GE3.03 Turbine model, received sound levels at the Project property boundary ranged from 25 dBA to 62 dBA; however, all locations with received sound levels greater than 50 dBA are classified as Class C land, where the applicable daytime and nighttime sound limit is 70 dBA.** • **For the Option 1 Project layout configuration using the GE2.82 Turbine model, received sound levels at the Project property boundary ranged from 29 dBA to 63 dBA; however, all locations with received sound levels greater than 50 dBA are classified as Class C land, where the applicable daytime and nighttime sound limit is 70 dBA.** • **For the Option 2 Project layout configuration using the GE5.5 Turbine model, received sound levels at the Project property boundary ranged from 24 dBA to 54 dBA; however, all locations with received sound levels greater than 50 dBA are classified as Class C land, where the applicable daytime and nighttime sound limit is 70 dBA.** • **For the Option 2 Project layout configuration using the SG6.0 Turbine model, received sound levels at the Project property boundary ranged from 21 dBA to 54 dBA; however, all locations with received sound levels greater than 50 dBA are classified as Class C land, where the applicable daytime and nighttime sound limit is 70 dBA.**
Noise-6	WAC: 463-60-352 Section 4.1.1.2	Noise Impacts	Include discussion on conditions, such as baseline and operational noise levels, when wind conditions indicate turbines will be operating.	**The response to this comment is provided in Attachment "Noise-6".**
Noise-7	WAC: 463-60-352 Section 4.1.1.2	Noise Impacts	Address blasting noise as a type of noise and quantify and discuss its impact level. Address Low Frequency Noise (LFN) generated by the wind turbine blades.	Wind Turbine tower foundations will normally be installed using drilled shafts or piers; however, if hard rock is encountered within the planned drilling depth, blasting may be required to loosen or fracture the rock in order to reach the required depth to install the structure foundations. Locations where blasting may be required will be identified during the final geotechnical engineering study. **Blasting is a short duration event as compared to rock removal methods such as using track rig drills, rock breakers, jack hammers, rotary percussion drills, core barrels, and/or rotary rock drills. Blasting creates a sudden and intense airborne noise potential as well as local ground vibration.** Modern blasting techniques include electronically controlled ignition of multiple small explosive charges in an area of rock. The detonations are timed so that the energy from individual detonations destructively interferes with each other, which is called wave canceling. **Impulse (instantaneous) noise from blasts could reach up to 140 dBA at the blast location, attenuating to approximately 90 dBA at a distance of 500 feet from the blast.** **There has been a lot of research done in the field of wind Turbine low frequency noise in the United States as well as overseas (MDEP 2012; NHMRC 2010).** Studies have shown that low frequency sound from wind turbines is below the threshold of human perception at standard setback distances. There has been no clearly demonstrated link between negative health effects on individuals when low frequency noise levels are present at an inaudible level. Health effects are associated with very high levels of low frequency noise that have occurred, for instance, with workers in jet engine testing facilities. These levels of concern are 20 or 30 times higher than the low frequency sound emitted by wind Turbines.
Noise-8	WAC: 463-60-352 Section 4.1.1.2	Noise Source Data	Clarify exactly what equipment/sources the following statement from Page 4-16 of the application applies to: "Sound source level details cannot be disclosed because that information is considered proprietary to the Turbine manufacturers."	Note that the statement on page 4-16 of the application that reads "Sound source level details cannot be disclosed because that information is considered proprietary to the Turbine manufacturers" should be revised to say "transformer manufacturers". **That statement is referencing Table 4.1.1-8 of the application, which presents information pertaining to the onsite substation transformers.** However, please note that for both the wind Turbine and the substation transformer, the sound specifications cannot be disclosed because they are considered proprietary by the applicable manufacturers.
Noise-9	WAC: 463-60-352 Section 4.1.1.2	Noise Source Data	Include all the source octave band data used in the operational noise modeling scenarios. If octave band data was not used in the model, define the sources and explain in detail how those sources were set up in the model.	**Octave band data were used for all of the sound sources modeled for the Project's acoustic analysis. Table 4.1.1-9 of the ACS presents the octave band data for the inverter/transformer blocks and BESS units.** While octave band data were also used for the wind Turbine and substation transformer sound sources, those details cannot be disclosed because they are considered proprietary by the manufacturers (see response to comment Noise-8).

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Recreation-1	WAC: 463-12-145 Section 4.2.4	Ice Age Flood – National Geologic Trail (IAF-NGT)	Comments were received concerning impacts to the IAF-NGT and hiking trails within the vicinity of the Project. Provide data related to the features of the IAF-NGT and hiking trails and their proximity to the Project. Provide potential impacts to the IAF-NGT and hiking trails within the vicinity of the Project.	**This analysis will be provided to EFSEC under separate cover at a later date.**

References

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Attachment Noise-4

Quantification of Construction Noise Levels at Noise Sensitive Receptors (NSRs).

Noise levels associated with construction of the Horse Heaven Wind Project were quantified at noise sensitive receptors (NSRs) within the Project boundary and all NSRs within 1 mile of the Project boundary. The construction noise analysis was completed at those NSRs because receptors further than 1 mile away would not be expected to experience construction noise impacts. Table 1 provides the results of the construction noise analysis for those NSRs within the Project lease boundary and Table 2 (attached) provides the results of the construction noise analysis for those NSRs located within 1 mile of the Project lease boundary. For the purposes of the construction noise analysis for those NSRs located within the Project lease boundary it was assumed that equipment would be positioned at the closest wind turbine generator (WTG) relative to each NSR. For the purposes of the construction noise analysis for those NSRs located within 1 mile of the Project lease boundary it was conservatively assumed that equipment would be positioned at the closest point along the Project lease boundary relative to each NSR.

Assuming that NSRs are considered Class A lands and the 60 dBA daytime and 50 dBA nighttime limits are applicable, there could be some potential exceedances of those limits at 60 NSRs (i.e., at NSR IDs 43, 20, 21, 65, 45, 227, 72, 80, 742, 81, 258, 18, 549, 737, 33, 39, 34, 36, 38, 31, 32, 35, 29, 37, 30, 40, 183, 27, 28, 25, 5, 26, 170, 23, 171, 24, 550, 548, 165, 167, 168, 551, 536, 161, 162, 163, 164, 19, 66, 156, 465, 547, 535, 592, 464, 159, 552, and 463); however, WAC 173-60-050 clearly states the following:

> *"3) The following shall be exempt from the provisions of WAC 173-60-040, except insofar as such provisions relate to the reception of noise within Class A EDNAs between the hours of 10:00 p.m. and 7:00 a.m."*
>
> > *"(a) Sounds originating from temporary construction sites as a result of construction activity."*

Therefore, as the Project construction will not occur between 10:00 pm and 7:00 pm, compliance with the WAC noise limits is not required.

Table 1. Construction Noise Levels at NSRs within the Project Boundary

Equipment	L_{max} Equipment Sound Level at 50 feet (dBA)	Usage Factor (%)[1/]	Equipment Sound Level at 50 feet, L_{eq} (dBA)	NSR IDs within the Project Boundary																		
				43	20	21	65	69	116	44	41	62	118	117	720	119	718	120	71	715	716	46
				Distance to closest WTG (feet)																		
				1258	1313	1410	1537	1850	2092	2121	2508	2911	3494	3513	3578	3652	3831	4010	6032	6093	6194	6550
Crane	85	16	77	40	39	38	37	35	34	34	32	30	28	28	28	27	27	26	22	22	21	21
Forklift	80	40	76	39	38	37	36	34	33	33	31	29	27	27	27	26	26	25	21	21	20	20
Backhoe	80	40	76	39	38	37	36	34	33	33	31	29	27	27	27	26	26	25	21	21	20	20
Grader	85	40	81	44	43	42	41	39	38	38	36	34	32	32	32	31	31	30	26	26	25	25
Man basket	85	20	78	41	40	39	38	36	35	35	33	31	29	29	29	28	28	27	23	23	22	22
Dozer	88	40	84	47	46	45	44	42	41	41	39	37	35	35	35	34	34	33	29	29	28	28
Loader	88	40	84	47	46	45	44	42	41	41	39	37	35	35	35	34	34	33	29	29	28	28
Scissor Lift	85	20	78	41	40	39	38	36	35	35	33	31	29	29	29	28	28	27	23	23	22	22
Truck	85	40	81	44	43	42	41	39	38	38	36	34	32	32	32	31	31	30	26	26	25	25
Welder	73	40	69	32	31	30	29	27	26	26	24	22	20	20	20	19	19	18	14	14	13	13
Compressor	80	40	76	39	38	37	36	34	33	33	31	29	27	27	27	26	26	25	21	21	20	20
Concrete Pump	77	50	74	37	36	35	34	32	31	31	29	27	25	25	25	24	24	23	19	19	18	18
Composite Equipment Sound Level at 2,000 feet, L_{eq} (dBA)				53	53	52	51	49	47	47	45	43	41	41	41	41	40	40	35	35	35	34

Table 2. Construction Noise Levels at NSRs within 1 mile of the Project Boundary

Equipment	L_{max} Equipment Sound Level at 50feet (dBA)	Usage Factor (%)[1/]	Equipment Sound Level at 50 feet, L_{eq}(dBA)	NSR IDs within 1 mile of the Project Boundary															
				45	227	72	79	80	742	81	258	18	549	737	33	39	34	36	38
				Distance to Project Boundary (feet)															
				75	82	136	138	157	178	276	464	495	526	560	651	662	685	696	697
Crane	85	16	77	72	71	65	65	64	62	57	51	51	50	49	47	47	47	47	47
Forklift	80	40	76	71	70	64	64	63	61	56	50	50	49	48	46	46	46	46	46
Backhoe	80	40	76	71	70	64	64	63	61	56	50	50	49	48	46	46	46	46	46
Grader	85	40	81	76	75	69	69	68	66	61	55	55	54	53	51	51	51	51	51
Man basket	85	20	78	73	72	66	66	65	63	58	52	52	51	50	48	48	48	48	48
Dozer	88	40	84	79	78	72	72	71	69	64	58	58	57	56	54	54	54	54	54
Loader	88	40	84	79	78	72	72	71	69	64	58	58	57	56	54	54	54	54	54
Scissor Lift	85	20	78	73	72	66	66	65	63	58	52	52	51	50	48	48	48	48	48
Truck	85	40	81	76	75	69	69	68	66	61	55	55	54	53	51	51	51	51	51
Welder	73	40	69	64	63	57	57	56	54	49	43	43	42	41	39	39	39	39	39
Compressor	80	40	76	71	70	64	64	63	61	56	50	50	49	48	46	46	46	46	46
Concrete Pump	77	50	74	69	68	62	62	61	59	54	48	47	47	46	44	44	44	44	44
Composite Equipment Sound Level at 2,000 feet, L_{eq} (dBA)				86	85	79	79	77	76	71	65	64	63	62	61	61	60	60	60

Table 2. Construction Noise Levels at NSRs within 1 mile of the Project Boundary (continued)

Equipment	L_{max} Equipment Sound Level at 50feet (dBA)	Usage Factor (%)[1/]	Equipment Sound Level at 50 feet, L_{eq}(dBA)	NSR IDs within 1 mile of the Project Boundary															
				31	32	35	29	37	30	40	183	27	28	25	5	26	170	23	171
				Distance to Project Boundary (feet)															
				714	743	763	766	766	777	794	826	829	845	889	916	917	917	957	977
Crane	85	16	77	46	46	46	46	46	45	45	45	45	44	44	43	43	43	43	43
Forklift	80	40	76	45	45	45	44	44	44	44	44	44	43	43	42	42	42	42	42
Backhoe	80	40	76	45	45	45	44	44	44	44	44	44	43	43	42	42	42	42	42
Grader	85	40	81	50	50	50	49	49	49	49	49	49	48	48	47	47	47	47	47
Man basket	85	20	78	47	47	47	46	46	46	46	46	46	45	45	44	44	44	44	44
Dozer	88	40	84	53	53	53	52	52	52	52	52	52	51	51	50	50	50	50	50
Loader	88	40	84	53	53	53	52	52	52	52	52	52	51	51	50	50	50	50	50
Scissor Lift	85	20	78	47	47	47	46	46	46	46	46	46	45	45	44	44	44	44	44
Truck	85	40	81	50	50	50	49	49	49	49	49	49	48	48	47	47	47	47	47
Welder	73	40	69	38	38	38	37	37	37	37	37	37	36	36	35	35	35	35	35
Compressor	80	40	76	45	45	45	44	44	44	44	44	44	43	43	42	42	42	42	42
Concrete Pump	77	50	74	43	43	43	42	42	42	42	42	42	41	41	40	40	40	40	40
Composite Equipment Sound Level at 2,000 feet, L_{eq} (dBA)				60	59	59	59	59	59	58	58	58	58	57	57	57	57	56	56

Table 2. Construction Noise Levels at NSRs within 1 mile of the Project Boundary (continued)

Equipment	L_{max} Equipment Sound Level at 50feet (dBA)	Usage Factor (%)[1/]	Equipment Sound Level at 50 feet, L_{eq}(dBA)	NSR IDs within 1 mile of the Project Boundary															
				24	550	548	165	166	167	168	551	536	161	162	163	164	19	66	156
				Distance to Project Boundary (feet)															
				980	1087	1170	1255	1264	1274	1294	1294	1305	1323	1328	1343	1360	1418	1427	1436
Crane	85	16	77	43	41	41	40	40	40	39	39	39	39	39	39	39	38	38	38
Forklift	80	40	76	42	40	40	39	39	39	38	38	38	38	38	38	38	37	37	37
Backhoe	80	40	76	42	40	40	39	39	39	38	38	38	38	38	38	38	37	37	37
Grader	85	40	81	47	45	45	44	44	44	43	43	43	43	43	43	43	42	42	42
Man basket	85	20	78	44	42	42	41	41	41	40	40	40	40	40	40	40	39	39	39
Dozer	88	40	84	50	48	48	47	47	47	46	46	46	46	46	46	46	45	45	45
Loader	88	40	84	50	48	48	47	47	47	46	46	46	46	46	46	46	45	45	45
Scissor Lift	85	20	78	44	42	42	41	41	41	40	40	40	40	40	40	40	39	39	39
Truck	85	40	81	47	45	45	44	44	44	43	43	43	43	43	43	43	42	42	42
Welder	73	40	69	35	33	33	32	32	32	31	31	31	31	31	31	31	30	30	30
Compressor	80	40	76	42	40	40	39	39	39	38	38	38	38	38	38	38	37	37	37
Concrete Pump	77	50	74	40	38	38	37	37	37	36	36	36	36	36	36	36	35	35	35
Composite Equipment Sound Level at 2,000 feet, L_{eq} (dBA)				56	55	54	53	53	53	53	53	53	53	52	52	52	52	52	52

Table 2. Construction Noise Levels at NSRs within 1 mile of the Project Boundary (continued)

Equipment	L_{max} Equipment Sound Level at 50feet (dBA)	Usage Factor (%)[1/]	Equipment Sound Level at 50 feet, L_{eq}(dBA)	NSR IDs within 1 mile of the Project Boundary															
				465	547	535	502	464	159	552	463	58	466	537	503	501	739	534	70
				Distance to Project Boundary (feet)															
				1436	1468	1473	1487	1511	1517	1529	1535	1603	1613	1644	1646	1651	1691	1711	1717
Crane	85	16	77	38	38	38	38	38	38	38	37	37	37	37	37	37	36	36	36
Forklift	80	40	76	37	37	37	37	37	37	37	36	36	36	36	36	36	35	35	35
Backhoe	80	40	76	37	37	37	37	37	37	37	36	36	36	36	36	36	35	35	35
Grader	85	40	81	42	42	42	42	42	42	42	41	41	41	41	41	41	40	40	40
Man basket	85	20	78	39	39	39	39	39	39	38	38	38	38	38	38	38	37	37	37
Dozer	88	40	84	45	45	45	45	45	45	45	44	44	44	44	44	44	43	43	43
Loader	88	40	84	45	45	45	45	45	45	45	44	44	44	44	44	44	43	43	43
Scissor Lift	85	20	78	39	39	39	39	39	39	38	38	38	38	38	38	38	37	37	37
Truck	85	40	81	42	42	42	42	42	42	42	41	41	41	41	41	41	40	40	40
Welder	73	40	69	30	30	30	30	30	30	30	29	29	29	29	29	29	28	28	28
Compressor	80	40	76	37	37	37	37	37	37	37	36	36	36	36	36	36	35	35	35
Concrete Pump	77	50	74	35	35	35	35	35	35	34	34	34	34	34	34	34	33	33	33
Composite Equipment Sound Level at 2,000 feet, L_{eq} (dBA)				52	51	51	51	51	51	51	51	50	50	50	50	50	50	50	50

Table 2. Construction Noise Levels at NSRs within 1 mile of the Project Boundary (continued)

Equipment	L_{max} Equipment Sound Level at 50feet (dBA)	Usage Factor (%)[1/]	Equipment Sound Level at 50 feet, L_{eq}(dBA)	NSR IDs within 1 mile of the Project Boundary															
				22	59	504	553	546	169	533	500	538	507	505	554	532	499	2	545
				Distance to Project Boundary (feet)															
				1736	1797	1818	1848	1850	1902	1923	1983	1994	2077	2077	2095	2119	2130	2131	2136
Crane	85	16	77	36	36	36	35	35	35	35	35	34	34	34	34	34	34	34	34
Forklift	80	40	76	35	35	35	34	34	34	34	34	33	33	33	33	33	33	33	33
Backhoe	80	40	76	35	35	35	34	34	34	34	34	33	33	33	33	33	33	33	33
Grader	85	40	81	40	40	40	39	39	39	39	39	38	38	38	38	38	38	38	38
Man basket	85	20	78	37	37	36	36	36	36	36	35	35	35	35	35	35	35	35	35
Dozer	88	40	84	43	43	43	42	42	42	42	42	41	41	41	41	41	41	41	41
Loader	88	40	84	43	43	43	42	42	42	42	42	41	41	41	41	41	41	41	41
Scissor Lift	85	20	78	37	37	36	36	36	36	36	35	35	35	35	35	35	35	35	35
Truck	85	40	81	40	40	40	39	39	39	39	39	38	38	38	38	38	38	38	38
Welder	73	40	69	28	28	28	27	27	27	27	27	26	26	26	26	26	26	26	26
Compressor	80	40	76	35	35	35	34	34	34	34	34	33	33	33	33	33	33	33	33
Concrete Pump	77	50	74	33	33	32	32	32	32	32	31	31	31	31	31	31	31	31	31
Composite Equipment Sound Level at 2,000 feet, L_{eq} (dBA)				49	49	49	49	49	48	48	48	48	47	47	47	47	47	47	47

Table 2. Construction Noise Levels at NSRs within 1 mile of the Project Boundary (continued)

Equipment	L_{max} Equipment Sound Level at 50feet (dBA)	Usage Factor (%)[1/]	Equipment Sound Level at 50 feet, L_{eq}(dBA)	NSR IDs within 1 mile of the Project Boundary															
				469	467	539	3	555	471	531	506	468	192	223	508	509	160	540	247
				Distance to Project Boundary (feet)															
				2141	2215	2221	2254	2276	2279	2300	2323	2334	2337	2391	2411	2412	2428	2445	2457
Crane	85	16	77	34	33	33	33	33	33	33	33	33	33	32	32	32	32	32	32
Forklift	80	40	76	33	32	32	32	32	32	32	32	32	32	31	31	31	31	31	31
Backhoe	80	40	76	33	32	32	32	32	32	32	32	32	32	31	31	31	31	31	31
Grader	85	40	81	38	37	37	37	37	37	37	37	37	37	36	36	36	36	36	36
Man basket	85	20	78	35	34	34	34	34	34	34	34	34	34	33	33	33	33	33	33
Dozer	88	40	84	41	40	40	40	40	40	40	40	40	40	39	39	39	39	39	39
Loader	88	40	84	41	40	40	40	40	40	40	40	40	40	39	39	39	39	39	39
Scissor Lift	85	20	78	35	34	34	34	34	34	34	34	34	34	33	33	33	33	33	33
Truck	85	40	81	38	37	37	37	37	37	37	37	37	37	36	36	36	36	36	36
Welder	73	40	69	26	25	25	25	25	25	25	25	25	25	24	24	24	24	24	24
Compressor	80	40	76	33	32	32	32	32	32	32	32	32	32	31	31	31	31	31	31
Concrete Pump	77	50	74	31	30	30	30	30	30	30	30	30	30	29	29	29	29	29	29
Composite Equipment Sound Level at 2,000 feet, L_{eq} (dBA)				47	47	47	46	46	46	46	46	46	46	46	46	46	46	45	45

Table 2. Construction Noise Levels at NSRs within 1 mile of the Project Boundary (continued)

Equipment	L_{max} Equipment Sound Level at 50feet (dBA)	Usage Factor (%)[1/]	Equipment Sound Level at 50 feet, L_{eq}(dBA)	NSR IDs within 1 mile of the Project Boundary															
				544	242	158	49	182	4	530	50	556	472	181	462	225	473	461	541
				Distance to Project Boundary (feet)															
				2464	2465	2480	2486	2506	2512	2552	2554	2557	2559	2588	2590	2608	2630	2641	2655
Crane	85	16	77	32	32	32	32	32	32	32	32	32	32	31	31	31	31	31	31
Forklift	80	40	76	31	31	31	31	31	31	31	31	31	31	30	30	30	30	30	30
Backhoe	80	40	76	31	31	31	31	31	31	31	31	31	31	30	30	30	30	30	30
Grader	85	40	81	36	36	36	36	36	36	36	36	36	36	35	35	35	35	35	35
Man basket	85	20	78	33	33	33	33	33	33	33	33	33	33	32	32	32	32	32	32
Dozer	88	40	84	39	39	39	39	39	39	39	39	39	39	38	38	38	38	38	38
Loader	88	40	84	39	39	39	39	39	39	39	39	39	39	38	38	38	38	38	38
Scissor Lift	85	20	78	33	33	33	33	33	33	33	33	33	33	32	32	32	32	32	32
Truck	85	40	81	36	36	36	36	36	36	36	36	36	36	35	35	35	35	35	35
Welder	73	40	69	24	24	24	24	24	24	24	24	24	24	23	23	23	23	23	23
Compressor	80	40	76	31	31	31	31	31	31	31	31	31	31	30	30	30	30	30	30
Concrete Pump	77	50	74	29	29	29	29	29	29	29	29	29	29	28	28	28	28	28	28
Composite Equipment Sound Level at 2,000 feet, L_{eq} (dBA)				45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	44

Table 2. Construction Noise Levels at NSRs within 1 mile of the Project Boundary (continued)

Equipment	L_{max} Equipment Sound Level at 50feet (dBA)	Usage Factor (%)[1/]	Equipment Sound Level at 50 feet, L_{eq}(dBA)	NSR IDs within 1 mile of the Project Boundary															
				470	241	543	60	243	6	121	528	460	157	522	542	222	57	521	246
				Distance to Project Boundary (feet)															
				2674	2690	2703	2709	2743	2747	2756	2785	2801	2825	2834	2874	2921	2927	2930	2932
Crane	85	16	77	31	31	31	31	31	31	31	31	31	30	30	30	30	30	30	30
Forklift	80	40	76	30	30	30	30	30	30	30	30	30	29	29	29	29	29	29	29
Backhoe	80	40	76	30	30	30	30	30	30	30	30	30	29	29	29	29	29	29	29
Grader	85	40	81	35	35	35	35	35	35	35	35	35	34	34	34	34	34	34	34
Man basket	85	20	78	32	32	32	32	32	32	32	32	32	31	31	31	31	31	31	31
Dozer	88	40	84	38	38	38	38	38	38	38	38	38	37	37	37	37	37	37	37
Loader	88	40	84	38	38	38	38	38	38	38	38	38	37	37	37	37	37	37	37
Scissor Lift	85	20	78	32	32	32	32	32	32	32	32	32	31	31	31	31	31	31	31
Truck	85	40	81	35	35	35	35	35	35	35	35	35	34	34	34	34	34	34	34
Welder	73	40	69	23	23	23	23	23	23	23	23	23	22	22	22	22	22	22	22
Compressor	80	40	76	30	30	30	30	30	30	30	30	30	29	29	29	29	29	29	29
Concrete Pump	77	50	74	28	28	28	28	28	28	28	28	27	27	27	27	27	27	27	27
Composite Equipment Sound Level at 2,000 feet, L_{eq} (dBA)				44	44	44	44	44	44	44	44	44	44	44	44	43	43	43	43

Table 2. Construction Noise Levels at NSRs within 1 mile of the Project Boundary (continued)

Equipment	L_{max} Equipment Sound Level at 50feet (dBA)	Usage Factor (%)[1/]	Equipment Sound Level at 50 feet, L_{eq}(dBA)	NSR IDs within 1 mile of the Project Boundary															
				226	474	510	740	53	221	175	523	244	484	17	527	220	519	498	176
				Distance to Project Boundary (feet)															
				2945	2949	2950	2951	2961	2969	2991	3016	3019	3019	3036	3036	3040	3041	3046	3073
Crane	85	16	77	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	29
Forklift	80	40	76	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	28
Backhoe	80	40	76	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	28
Grader	85	40	81	34	34	34	34	34	34	34	34	34	34	34	34	34	34	34	33
Man basket	85	20	78	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	30
Dozer	88	40	84	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	36
Loader	88	40	84	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	36
Scissor Lift	85	20	78	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	30
Truck	85	40	81	34	34	34	34	34	34	34	34	34	34	34	34	34	34	34	33
Welder	73	40	69	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	21
Compressor	80	40	76	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	28
Concrete Pump	77	50	74	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	26
Composite Equipment Sound Level at 2,000 feet, L_{eq} (dBA)				43	43	43	43	43	43	43	43	43	43	43	43	43	43	43	43

Table 2. Construction Noise Levels at NSRs within 1 mile of the Project Boundary (continued)

Equipment	L_{max} Equipment Sound Level at 50feet (dBA)	Usage Factor (%)[1/]	Equipment Sound Level at 50 feet, L_{eq}(dBA)	NSR IDs within 1 mile of the Project Boundary															
				485	16	529	174	475	1	520	232	52	218	518	525	245	7	497	219
				Distance to Project Boundary (feet)															
				3088	3092	3093	3116	3142	3154	3181	3193	3201	3226	3226	3257	3259	3262	3273	3275
Crane	85	16	77	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29
Forklift	80	40	76	28	28	28	28	28	28	28	28	28	28	28	28	28	28	28	28
Backhoe	80	40	76	28	28	28	28	28	28	28	28	28	28	28	28	28	28	28	28
Grader	85	40	81	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33
Man basket	85	20	78	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30
Dozer	88	40	84	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36
Loader	88	40	84	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36
Scissor Lift	85	20	78	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30
Truck	85	40	81	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33
Welder	73	40	69	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21
Compressor	80	40	76	28	28	28	28	28	28	28	28	28	28	28	28	28	28	28	28
Concrete Pump	77	50	74	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26
Composite Equipment Sound Level at 2,000 feet, L_{eq} (dBA)				43	43	43	43	43	42	42	42	42	42	42	42	42	42	42	42

Table 2. Construction Noise Levels at NSRs within 1 mile of the Project Boundary (continued)

Equipment	L_{max} Equipment Sound Level at 50feet (dBA)	Usage Factor (%)[1/]	Equipment Sound Level at 50 feet, L_{eq}(dBA)	NSR IDs within 1 mile of the Project Boundary															
				177	206	207	511	240	194	524	476	483	173	89	124	178	217	733	587
				Distance to Project Boundary (feet)															
				3284	3290	3291	3294	3310	3316	3338	3345	3361	3373	3380	3397	3406	3407	3408	3414
Crane	85	16	77	29	29	29	29	29	29	29	28	28	28	28	28	28	28	28	28
Forklift	80	40	76	28	28	28	28	28	28	27	27	27	27	27	27	27	27	27	27
Backhoe	80	40	76	28	28	28	28	28	28	27	27	27	27	27	27	27	27	27	27
Grader	85	40	81	33	33	33	33	33	33	32	32	32	32	32	32	32	32	32	32
Man basket	85	20	78	30	30	30	30	30	30	29	29	29	29	29	29	29	29	29	29
Dozer	88	40	84	36	36	36	36	36	36	35	35	35	35	35	35	35	35	35	35
Loader	88	40	84	36	36	36	36	36	36	35	35	35	35	35	35	35	35	35	35
Scissor Lift	85	20	78	30	30	30	30	30	30	29	29	29	29	29	29	29	29	29	29
Truck	85	40	81	33	33	33	33	33	33	32	32	32	32	32	32	32	32	32	32
Welder	73	40	69	21	21	21	21	21	21	20	20	20	20	20	20	20	20	20	20
Compressor	80	40	76	28	28	28	28	28	28	27	27	27	27	27	27	27	27	27	27
Concrete Pump	77	50	74	26	26	26	26	26	26	25	25	25	25	25	25	25	25	25	25
Composite Equipment Sound Level at 2,000 feet, L_{eq} (dBA)				42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42

Table 2. Construction Noise Levels at NSRs within 1 mile of the Project Boundary (continued)

Equipment	L_{max} Equipment Sound Level at 50feet (dBA)	Usage Factor (%)[1/]	Equipment Sound Level at 50 feet, L_{eq}(dBA)	NSR IDs within 1 mile of the Project Boundary															
				172	196	486	56	195	590	588	193	496	150	526	477	589	51	179	224
				Distance to Project Boundary (feet)															
				3421	3436	3437	3458	3461	3461	3462	3464	3473	3497	3497	3520	3534	3539	3551	3574
Crane	85	16	77	28	28	28	28	28	28	28	28	28	28	28	28	28	28	28	28
Forklift	80	40	76	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27
Backhoe	80	40	76	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27
Grader	85	40	81	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32
Man basket	85	20	78	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29
Dozer	88	40	84	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35
Loader	88	40	84	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35
Scissor Lift	85	20	78	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29
Truck	85	40	81	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32
Welder	73	40	69	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20
Compressor	80	40	76	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27
Concrete Pump	77	50	74	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25
Composite Equipment Sound Level at 2,000 feet, L_{eq} (dBA)				42	41	41	41	41	41	41	41	41	41	41	41	41	41	41	41

Table 2. Construction Noise Levels at NSRs within 1 mile of the Project Boundary (continued)

Equipment	L_{max} Equipment Sound Level at 50feet (dBA)	Usage Factor (%)[1/]	Equipment Sound Level at 50 feet, L_{eq}(dBA)	NSR IDs within 1 mile of the Project Boundary															
				205	512	208	517	61	144	216	88	180	143	48	8	202	145	191	9
				Distance to Project Boundary (feet)															
				3581	3587	3600	3602	3616	3623	3625	3629	3631	3634	3641	3647	3649	3667	3690	3693
Crane	85	16	77	28	28	28	28	28	28	28	28	28	28	28	27	27	27	27	27
Forklift	80	40	76	27	27	27	27	27	27	27	27	27	27	26	26	26	26	26	26
Backhoe	80	40	76	27	27	27	27	27	27	27	27	27	27	26	26	26	26	26	26
Grader	85	40	81	32	32	32	32	32	32	32	32	32	32	31	31	31	31	31	31
Man basket	85	20	78	29	29	29	29	29	29	29	29	29	28	28	28	28	28	28	28
Dozer	88	40	84	35	35	35	35	35	35	35	35	35	35	34	34	34	34	34	34
Loader	88	40	84	35	35	35	35	35	35	35	35	35	35	34	34	34	34	34	34
Scissor Lift	85	20	78	29	29	29	29	29	29	29	29	29	28	28	28	28	28	28	28
Truck	85	40	81	32	32	32	32	32	32	32	32	32	32	31	31	31	31	31	31
Welder	73	40	69	20	20	20	20	20	20	20	20	20	20	19	19	19	19	19	19
Compressor	80	40	76	27	27	27	27	27	27	27	27	27	27	26	26	26	26	26	26
Concrete Pump	77	50	74	25	25	25	25	25	25	25	24	24	24	24	24	24	24	24	24
Composite Equipment Sound Level at 2,000 feet, L_{eq} (dBA)				41	41	41	41	41	41	41	41	41	41	41	41	41	41	41	41

Table 2. Construction Noise Levels at NSRs within 1 mile of the Project Boundary (continued)

Equipment	L_{max} Equipment Sound Level at 50feet (dBA)	Usage Factor (%)[1/]	Equipment Sound Level at 50 feet, L_{eq}(dBA)	NSR IDs within 1 mile of the Project Boundary															
				482	83	129	133	487	211	495	54	215	516	586	265	132	68	87	478
				Distance to Project Boundary (feet)															
				3693	3710	3717	3726	3740	3772	3772	3773	3774	3776	3796	3811	3814	3817	3825	3827
Crane	85	16	77	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27
Forklift	80	40	76	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26
Backhoe	80	40	76	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26
Grader	85	40	81	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31
Man basket	85	20	78	28	28	28	28	28	28	28	28	28	28	28	28	28	28	28	28
Dozer	88	40	84	34	34	34	34	34	34	34	34	34	34	34	34	34	34	34	34
Loader	88	40	84	34	34	34	34	34	34	34	34	34	34	34	34	34	34	34	34
Scissor Lift	85	20	78	28	28	28	28	28	28	28	28	28	28	28	28	28	28	28	28
Truck	85	40	81	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31
Welder	73	40	69	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19
Compressor	80	40	76	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26
Concrete Pump	77	50	74	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24
Composite Equipment Sound Level at 2,000 feet, L_{eq} (dBA)				41	41	41	41	41	40	40	40	40	40	40	40	40	40	40	40

Table 2. Construction Noise Levels at NSRs within 1 mile of the Project Boundary (continued)

Equipment	L_{max} Equipment Sound Level at 50feet (dBA)	Usage Factor (%)[1/]	Equipment Sound Level at 50 feet, L_{eq}(dBA)	NSR IDs within 1 mile of the Project Boundary															
				228	214	131	513	238	239	213	204	735	10	591	47	154	128	514	481
				Distance to Project Boundary (feet)															
				3830	3835	3838	3843	3847	3847	3877	3894	3904	3909	3916	3937	3941	3946	3946	3953
Crane	85	16	77	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27
Forklift	80	40	76	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26
Backhoe	80	40	76	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26
Grader	85	40	81	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31
Man basket	85	20	78	28	28	28	28	28	28	28	28	28	28	28	28	28	28	28	28
Dozer	88	40	84	34	34	34	34	34	34	34	34	34	34	34	34	34	34	34	34
Loader	88	40	84	34	34	34	34	34	34	34	34	34	34	34	34	34	34	34	34
Scissor Lift	85	20	78	28	28	28	28	28	28	28	28	28	28	28	28	28	28	28	28
Truck	85	40	81	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31
Welder	73	40	69	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19
Compressor	80	40	76	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26
Concrete Pump	77	50	74	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24
Composite Equipment Sound Level at 2,000 feet, L_{eq} (dBA)				40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40

Table 2. Construction Noise Levels at NSRs within 1 mile of the Project Boundary (continued)

Equipment	L_{max} Equipment Sound Level at 50feet (dBA)	Usage Factor (%)[1/]	Equipment Sound Level at 50 feet, L_{eq}(dBA)	NSR IDs within 1 mile of the Project Boundary															
				142	149	55	494	130	11	488	515	255	734	127	236	585	190	210	209
				Distance to Project Boundary (feet)															
				3958	3966	3973	3974	3976	3985	4011	4011	4015	4022	4023	4029	4037	4045	4060	4061
Crane	85	16	77	27	27	26	26	26	26	26	26	26	26	26	26	26	26	26	26
Forklift	80	40	76	26	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25
Backhoe	80	40	76	26	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25
Grader	85	40	81	31	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30
Man basket	85	20	78	28	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27
Dozer	88	40	84	34	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33
Loader	88	40	84	34	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33
Scissor Lift	85	20	78	28	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27
Truck	85	40	81	31	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30
Welder	73	40	69	19	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18
Compressor	80	40	76	26	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25
Concrete Pump	77	50	74	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23
Composite Equipment Sound Level at 2,000 feet, L_{eq} (dBA)				40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40

Table 2. Construction Noise Levels at NSRs within 1 mile of the Project Boundary (continued)

Equipment	L_{max} Equipment Sound Level at 50feet (dBA)	Usage Factor (%)[1/]	Equipment Sound Level at 50 feet, L_{eq}(dBA)	NSR IDs within 1 mile of the Project Boundary															
				201	229	266	493	261	200	615	479	212	203	252	557	86	155	12	126
				Distance to Project Boundary (feet)															
				4103	4103	4118	4142	4158	4159	4168	4175	4179	4181	4182	4192	4193	4211	4229	4235
Crane	85	16	77	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26
Forklift	80	40	76	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25
Backhoe	80	40	76	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25
Grader	85	40	81	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30
Man basket	85	20	78	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27
Dozer	88	40	84	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33
Loader	88	40	84	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33
Scissor Lift	85	20	78	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27
Truck	85	40	81	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30
Welder	73	40	69	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18
Compressor	80	40	76	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25
Concrete Pump	77	50	74	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23
Composite Equipment Sound Level at 2,000 feet, L_{eq} (dBA)				39	39	39	39	39	39	39	39	39	39	39	39	39	39	39	39

Table 2. Construction Noise Levels at NSRs within 1 mile of the Project Boundary (continued)

Equipment	L_{max} Equipment Sound Level at 50feet (dBA)	Usage Factor (%)[1/]	Equipment Sound Level at 50 feet, L_{eq}(dBA)	NSR IDs within 1 mile of the Project Boundary															
				736	492	112	267	248	231	14	146	125	148	268	592	270	113	109	269
				Distance to Project Boundary (feet)															
				4247	4262	4267	4274	4294	4305	4324	4330	4338	4366	4370	4376	4388	4398	4431	4431
Crane	85	16	77	26	26	26	26	26	26	26	26	25	25	25	25	25	25	25	25
Forklift	80	40	76	25	25	25	25	25	25	24	24	24	24	24	24	24	24	24	24
Backhoe	80	40	76	25	25	25	25	25	25	24	24	24	24	24	24	24	24	24	24
Grader	85	40	81	30	30	30	30	30	30	29	29	29	29	29	29	29	29	29	29
Man basket	85	20	78	27	27	27	27	27	27	26	26	26	26	26	26	26	26	26	26
Dozer	88	40	84	33	33	33	33	33	33	32	32	32	32	32	32	32	32	32	32
Loader	88	40	84	33	33	33	33	33	33	32	32	32	32	32	32	32	32	32	32
Scissor Lift	85	20	78	27	27	27	27	27	27	26	26	26	26	26	26	26	26	26	26
Truck	85	40	81	30	30	30	30	30	30	29	29	29	29	29	29	29	29	29	29
Welder	73	40	69	18	18	18	18	18	18	17	17	17	17	17	17	17	17	17	17
Compressor	80	40	76	25	25	25	25	25	25	24	24	24	24	24	24	24	24	24	24
Concrete Pump	77	50	74	23	23	23	23	23	23	22	22	22	22	22	22	22	22	22	22
Composite Equipment Sound Level at 2,000 feet, L_{eq} (dBA)				39	39	39	39	39	39	39	39	39	39	39	39	39	39	39	39

Table 2. Construction Noise Levels at NSRs within 1 mile of the Project Boundary (continued)

Equipment	L_{max} Equipment Sound Level at 50feet (dBA)	Usage Factor (%)[1/]	Equipment Sound Level at 50 feet, L_{eq}(dBA)	NSR IDs within 1 mile of the Project Boundary															
				262	151	13	480	489	199	115	98	491	189	593	198	97	84	105	235
				Distance to Project Boundary (feet)															
				4443	4449	4450	4450	4450	4455	4477	4477	4480	4494	4497	4497	4510	4510	4512	4516
Crane	85	16	77	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25
Forklift	80	40	76	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24
Backhoe	80	40	76	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24
Grader	85	40	81	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29
Man basket	85	20	78	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26
Dozer	88	40	84	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32
Loader	88	40	84	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32
Scissor Lift	85	20	78	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26
Truck	85	40	81	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29
Welder	73	40	69	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17
Compressor	80	40	76	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24
Concrete Pump	77	50	74	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22
Composite Equipment Sound Level at 2,000 feet, L_{eq} (dBA)				39	39	39	39	39	38	38	38	38	38	38	38	38	38	38	38

Table 2. Construction Noise Levels at NSRs within 1 mile of the Project Boundary (continued)

Equipment	L_{max} Equipment Sound Level at 50feet (dBA)	Usage Factor (%)[1/]	Equipment Sound Level at 50 feet, L_{eq}(dBA)	NSR IDs within 1 mile of the Project Boundary															
				123	584	15	114	732	237	102	185	271	249	104	256	103	152	272	85
				Distance to Project Boundary (feet)															
				4517	4519	4520	4527	4533	4536	4601	4606	4613	4621	4648	4661	4672	4707	4721	4728
Crane	85	16	77	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	24
Forklift	80	40	76	24	24	24	24	24	24	24	24	24	24	24	24	24	24	23	23
Backhoe	80	40	76	24	24	24	24	24	24	24	24	24	24	24	24	24	24	23	23
Grader	85	40	81	29	29	29	29	29	29	29	29	29	29	29	29	29	29	28	28
Man basket	85	20	78	26	26	26	26	26	26	26	26	26	26	26	26	26	26	25	25
Dozer	88	40	84	32	32	32	32	32	32	32	32	32	32	32	32	32	32	31	31
Loader	88	40	84	32	32	32	32	32	32	32	32	32	32	32	32	32	32	31	31
Scissor Lift	85	20	78	26	26	26	26	26	26	26	26	26	26	26	26	26	26	25	25
Truck	85	40	81	29	29	29	29	29	29	29	29	29	29	29	29	29	29	28	28
Welder	73	40	69	17	17	17	17	17	17	17	17	17	17	17	17	17	17	16	16
Compressor	80	40	76	24	24	24	24	24	24	24	24	24	24	24	24	24	24	23	23
Concrete Pump	77	50	74	22	22	22	22	22	22	22	22	22	22	22	22	22	21	21	21
Composite Equipment Sound Level at 2,000 feet, L_{eq} (dBA)				38	38	38	38	38	38	38	38	38	38	38	38	38	38	38	38

Table 2. Construction Noise Levels at NSRs within 1 mile of the Project Boundary (continued)

Equipment	L_{max} Equipment Sound Level at 50feet (dBA)	Usage Factor (%)[1/]	Equipment Sound Level at 50 feet, L_{eq}(dBA)	NSR IDs within 1 mile of the Project Boundary															
				141	96	42	263	490	616	188	273	122	234	233	693	108	106	153	107
				Distance to Project Boundary (feet)															
				4736	4737	4756	4762	4764	4764	4781	4799	4805	4821	4839	4862	4866	4869	4871	4871
Crane	85	16	77	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24
Forklift	80	40	76	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23
Backhoe	80	40	76	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23
Grader	85	40	81	28	28	28	28	28	28	28	28	28	28	28	28	28	28	28	28
Man basket	85	20	78	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25
Dozer	88	40	84	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31
Loader	88	40	84	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31
Scissor Lift	85	20	78	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25
Truck	85	40	81	28	28	28	28	28	28	28	28	28	28	28	28	28	28	28	28
Welder	73	40	69	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16
Compressor	80	40	76	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23
Concrete Pump	77	50	74	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21
Composite Equipment Sound Level at 2,000 feet, L_{eq} (dBA)				38	38	38	38	38	38	38	38	38	38	38	37	37	37	37	37

Table 2. Construction Noise Levels at NSRs within 1 mile of the Project Boundary (continued)

Equipment	L_{max} Equipment Sound Level at 50feet (dBA)	Usage Factor (%)[1/]	Equipment Sound Level at 50 feet, L_{eq}(dBA)	NSR IDs within 1 mile of the Project Boundary															
				595	274	583	99	629	111	140	253	582	90	197	618	694	603	100	136
				Distance to Project Boundary (feet)															
				4889	4920	4952	4953	4957	4968	5000	5054	5058	5072	5076	5079	5080	5102	5105	5118
Crane	85	16	77	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24
Forklift	80	40	76	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23
Backhoe	80	40	76	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23
Grader	85	40	81	28	28	28	28	28	28	28	28	28	28	28	28	28	28	28	28
Man basket	85	20	78	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25
Dozer	88	40	84	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31
Loader	88	40	84	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31
Scissor Lift	85	20	78	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25
Truck	85	40	81	28	28	28	28	28	28	28	28	28	28	28	28	28	28	28	28
Welder	73	40	69	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16
Compressor	80	40	76	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23
Concrete Pump	77	50	74	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21
Composite Equipment Sound Level at 2,000 feet, L_{eq} (dBA)				37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37

Table 2. Construction Noise Levels at NSRs within 1 mile of the Project Boundary (continued)

Equipment	L_{max} Equipment Sound Level at 50feet (dBA)	Usage Factor (%)[1/]	Equipment Sound Level at 50 feet, L_{eq}(dBA)	NSR IDs within 1 mile of the Project Boundary													
				230	187	276	264	594	695	251	604	596	254	101	296	275	135
				Distance to Project Boundary (feet)													
				5153	5155	5171	5178	5179	5204	5205	5209	5215	5216	5219	5224	5239	5247
Crane	85	16	77	23	23	23	23	23	23	23	23	23	23	23	23	23	23
Forklift	80	40	76	22	22	22	22	22	22	22	22	22	22	22	22	22	22
Backhoe	80	40	76	22	22	22	22	22	22	22	22	22	22	22	22	22	22
Grader	85	40	81	27	27	27	27	27	27	27	27	27	27	27	27	27	27
Man basket	85	20	78	24	24	24	24	24	24	24	24	24	24	24	24	24	24
Dozer	88	40	84	30	30	30	30	30	30	30	30	30	30	30	30	30	30
Loader	88	40	84	30	30	30	30	30	30	30	30	30	30	30	30	30	30
Scissor Lift	85	20	78	24	24	24	24	24	24	24	24	24	24	24	24	24	24
Truck	85	40	81	27	27	27	27	27	27	27	27	27	27	27	27	27	27
Welder	73	40	69	15	15	15	15	15	15	15	15	15	15	15	15	15	15
Compressor	80	40	76	22	22	22	22	22	22	22	22	22	22	22	22	22	22
Concrete Pump	77	50	74	20	20	20	20	20	20	20	20	20	20	20	20	20	20
Composite Equipment Sound Level at 2,000 feet, L_{eq} (dBA)				37	37	37	37	37	37	37	37	37	37	37	37	37	37

Attachment Noise-6

The acoustic modeling analysis and compliance assessment presented in the application assumed all wind turbines were operating simultaneously and continuously at maximum rated power when in reality it is more likely that wind turbines will be operating at lower wind speeds, which in turn produce lower sound emissions. Therefore, while ambient sound levels might be lower at lower wind speeds, so will the wind turbine sound emissions. Please see the table below, which shows the wind turbine sound power level by wind speed for each Project site layout configuration under consideration. In addition, the Project study area daytime and nighttime ambient sound levels are given according to wind speed as well.

Wind Turbine Sound Power Levels (dBA) Correlated with Wind Speed

Turbine		Wind Turbine L_{max} Sound Power Level (L_W) at Reference Wind Speed (meters per second / miles per hour)									
		3/6.7	4/8.9	5/11.2	6/13.4	7/15.7	8/17.9	9/20.1	10/22.4	11/24.6	12/26.8
Option 1 Layout - GE 2.82		-	96.7	96.9	100.4	103.9	106.8	109.2	110	110	110
Option 1 Layout - GE 3.03		-	95.4	96.1	100.0	103.3	106.2	108.0	108.0	108.0	108.0
Option 2 Layout - GE 5.5		-	93.8	94.5	97.6	101.0	104.0	106.4	107.5	107.5	107.5
Option 2 Layout - SG 6.0		92.0	92.0	94.5	98.4	101.8	104.7	106.0	106.0	106.0	106.0
Project Area Ambient Sound Levels	Day	38	39	39	39	39	39	40	40	40	40
	Night	37	37	37	38	38	38	39	39	40	40

Wind energy facilities, in comparison to other energy-related facilities, are somewhat unique in that the sound generated by each individual wind Turbine will increase as the wind speed across the site increases. Wind Turbine sound is negligible when the rotor is at rest, increases as the rotor tip speed increases, and is generally constant once rated power output and maximum rotational speed are achieved. It is important to recognize as wind speeds increase, the background ambient sound level will generally increase as well, resulting in acoustic masking effects; however, this trend is also affected by local contributing sound sources. The net result is that during periods of elevated wind speeds when higher wind Turbine sound emissions occur, the sound produced from a wind Turbine operating at maximum rotational speed may be largely or fully masked due to wind generated sound in foliage or vegetation. In practical terms, this means a nearby receptor would tend to hear leaves or vegetation rustling rather than wind Turbine noise.